

Urban Ecology: Estuary in the Classroom

Brooklyn College City as a Lab GK-12 Program
Academy for Urban Planning

Time: 90 min
(2 class Periods)
Hands On? Yes ; Internet? Yes

Standards Met: *Living Environment: Standard 1; PI 1.4, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3 Standard 1; PI 1.4, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3; Standard 4; PI 1.1, 6.1, 6.3, 7.1, 7.2; Earth Science: Standard 1; Key Ideas 1, 2, 3 : Standard 2; Key idea 1 Standard 1; Key Ideas 1, 2, 3 : Standard 2; Key idea 1 Standard 4; PI 1.2*

Title: Estuary in the Classroom
Grade and Subject: 11th (Urban Ecology)
Number of Days for Completion: 1
Overreaching Goals/ Outcomes: What are the components of an estuary and how they work? Why are estuaries important for urban ecology?
Learning Goals/Outcomes: SWBAT- Understand the how an estuary works. Differentiate between fresh, marine and brackish ecosystems. Perform tasks to setup an estuary and maintain urban organisms.
Materials: Aquarium, bio-filtration device, air pump, heater, coral sediment, decorations such as shells, plastic plants, lid with light, light timer, power surge, fish food, fish and/or crabs (we went seining for fish), salt, de-chlorinator, fish net, water test kits, 5 gallon buckets, syphon with hand pump, paper towels or cloths, sink and drain. Computer and screen for introduction about estuaries and estuary video (http://www.chesapeakebay.net/discover/bayecosystem/estuarystem)
Introduction: This is a 1 day lab activity where students will setup an estuary in the classroom to solidify their understanding of estuarine ecosystems.
Instruction/Direct Experience: The instructor will give a 20-minute introduction on estuaries and connect students with to their New York City estuarine system. The introduction transitions into what an estuary and the classroom aquarium need to thrive and explains the tasks to set up an estuary in the classroom. The instructor will also explain how the fish will be introduced into the class aquarium how they were caught. A follow along, fill in the blank sheet will be helpful in highlighting important key terms related to estuaries. After the instruction the students will be divided into groups as follows: Class 1: 1) Clean tanks with bleach and rinse 2) mix and rinse sediments 3) test tap water for ammonia, nitrate, nitrite, pH 4) de-chlorinate and measure salt then add to 2 5-gallon buckets of tap water Class 2: 1) Rinse decorations with bleach then with water 2) add heater and make sure it works in a bucket, set up aeration with air pump and tubing 3) set up bio-filtration 4) finish filling tanks with salt water
Independent Activities: Students will be asked to evaluate which activities they participated and share with the group the importance. Students will be asked to evaluate their interest in a student run aquarium club where more detailed monitoring of aquarium health will be performed.

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Assessment: Students will be asked to participate in setting up an estuary by completing various tasks.

Connections: The setup of an estuary in the classroom ties the field trips to Newtown Creek, Jamaica Bay, and the Rockaways. During the field trips the students are asked to evaluate the environment including water quality, weather, and indicator species. In future lessons, students will be asked to evaluate their aquarium in relation to NYC surrounding water bodies.